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NOTES ON PRODUCTION AND INSTALLATIONS
AT "EAST" AND "WEST" METALLURGICAL COMBINES, GDR

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"East Metallurgical Combine, Fuerstenberg/Oder

The dimensions of the blast furnaces which are to be installed at the plant and of furnace No I, which is already in operation, are as follows (in meters):

Height from foundation to charging platform	32.0
Outside diameter of furnace	13.5
Height of individual sections of the furnace:	
Foundation base	2.0
Hearth	4.0

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Bosh (bottom cone-shaped chamber)	6.0
Cylindrical section at furnace belly	2.0
Shaft (top cone-shaped chamber)	18.0
Height of structure above charging platform, which houses lifting apparatuses for furnace-top distributors, opening for inclined hoist, etc.	10
Total height of furnace	42

The inside-diameter measurements of the blast furnace, which has an average wall thickness of 1 to 1.2 meters, are as follows (in meters):

At furnace belly, widest part of blast-furnace chamber	7.0
Bosh (bottom)	6.0
Bosh (top)	3.8
Hearth	4.0
Shaft (top)	4.7

The blast furnaces are supported by a steel construction. The shafts rest on 12 steel props. Each furnace has four air heaters, each 6 meters in diameter and 26 meters high, which are operated by gas engines (blast-furnace gas). The other installations, apparatuses, machines, and accessories, such as transportation installations, grinding mills, and presses, are of the usual conventional type.

With a daily charge of 1,000 tons of ore mixture per furnace, the blast furnaces of the "East" Metallurgical Combine are to yield, to begin with, 300-320 tons of pig iron per day; a slag yield of 50-70 percent is estimated. The time required for the passage of the charge from the throat of the blast furnace to the hearth is 18-20 hours.

The following temperatures have been established for each furnace:

For preheating in upper part of shaft -- 200-400 degrees

For production zone (reduction and carbonization zones) in furnace belly and upper part of bosh -- 800-1,400 degrees

For smelting zone (lower part of bosh and hearth) -- 1,600-1,800 degrees

Furnace No I and the furnaces which are to be installed will be charged in the following manner: coke, limestone, ore, ... coke, limestone, ore, ... etc.

Theoretically, the product of the furnace should be perfect pig iron. Faulty materials or faulty construction, which have prevented the normal charging of furnace No I, are the main reasons for the failures up to the present. Furthermore, there have been breakdowns in connection with the lifting apparatuses for the furnace-top bells and furnace-top distributors, which have required up to 10 hours to remedy. Breakdowns have occurred at the inclined hoist and the revolving mechanism of the hoist bucket; once, the cable transporting the bucket broke, and, at the same time, the safety apparatus broke down, so that the bucket fell with full force into the storage bins, and both the bucket and the bin were severely damaged. Breakdowns also have occurred in connection with the chain conveyers. The blast-furnace-gas cleaner had to be put out of operation temporarily, because the ore-dust remover did not work. These incidents have resulted in irregular charging of the furnace and thus in failures.

"Vesta" Steel Plant, Calbe/Saale ("West" Metallurgical Combine)

1. This plant was supposed to produce 1,500 tons of usable pig iron by 31 December 1951, and was to have received a bonus from Minister Selbmann upon the achievement of this goal. However, only 1,200 tons were produced. Various defects accounted for this failure to meet the quota. These defects had not appeared at Unterwellenborn, where the /trial/ low-shaft blast furnaces were built and tested, because there the low-shaft blast furnaces were coupled with regular blast furnaces. That is, the gases from the low-shaft blast furnaces were used together with those from the regular blast furnaces. In Calbe, however, the low-shaft blast furnaces must operate independently. The blast-furnace gases are drawn off, purified, and used in a manner different from the method used in connection with regular blast-furnace operations. The "Vesta" Plant in Calbe is a practical test of the large-scale use of low-shaft blast furnaces without coupling them with regular blast furnaces.

2. Almost without exception, the difficulties at the Calbe plant arise from new, untested methods in the production and use of gas. The difficulties occur chiefly in connection with drawing off the blast-furnace gas through the exhauster. Up to now, it has not been possible to purify the gas so that it can be used without danger to the exhauster and the pressure pipes.

On 8 December 1951, between 1400 and 1500 hours, the gas exhauster was again put into operation. However, on the night of 9 December 1951, it had to be put out of commission again, because it was completely clogged with impurities. An attempt was then made to force the gas directly from the furnace to the Cowper stove. This involved the danger that the pipelines for the purified gas might also become clogged up.

3. The new Theisen washer was supposed to be ready on 12 December 1951, but this deadline could not be met because the foundation was not finished. On 13 December 1951, there was a 4-5 centimeter layer of impurities on the inside walls of the pipeline for purified gas. During the night of 12 - 13 December 1951, a record output of 70 tons of pig iron was achieved; a special shift was worked, and the quota was fulfilled by about 148 percent. On 13 December 1951, the electrical installations for furnace No II were completed. The VEM (Federation of People-Owned Enterprises for Electrical Machine Building) received a bonus of 800 Deutsche marks for completing the installations within the specified time. According to press reports, furnace No II was supposed to have been finished on 15 December 1951. Actually, however, it was not completed until 20 December.

4. On 17 December 1951, furnace No I had to be put out of commission again, because the gas pipelines and dust catchers were entirely clogged with impurities. The plant's personnel department announced that furnace No I had to be put out of operation because of an act of sabotage; allegedly, a sack of cement had been found in the gas line. However, the damage done to the brick lining of the furnace was not so great as to warrant a shutdown.

5. On 20 December the foundation for the Theisen washer was completed, and on 22 December 1951, furnace No I was put back into operation. The Cowper stove was oil-heated. However, on 26 December 1951, the furnace had to be put out of operation again because the minimum temperature (800 degrees) could not be attained in the Cowper stove. Furthermore, the hot-air pipe at the outlet of Cowper stove No I was burnt through and required 24 hours to repair.

6. Furnace No I was put in operation again on 28 December 1951. Suddenly, however, it was discovered that the fuel oil available to heat the Cowper stove would suffice for 8 hours of operation only. By order of the ministry in Berlin, a special locomotive was dispatched to Gross-Korbetha immediately to bring three tank cars of fuel oil to Calbe; but upon the arrival of this shipment, it was found that the oil did not burn. It was not until the morning of 29 December 1951 that three tank cars of usable fuel oil arrived at Calbe. In the meantime, furnace No I was again at a standstill.

On 30 December 1951, Cowper stove No II broke down because, the hot-air pipe was burnt through (as had previously happened with Cowper stove No I). Thus, the furnace had to be operated with Cowper stove No I only.

7. The Theisen washer was finally completed on 30 December 1951. The trial run of the washer, conducted from 31 December 1951 to 4 January 1952, was successful. On 4 January 1952, the washer was incorporated in the production process, and the use of the exhauster was no longer necessary. The Theisen washer, which is operated by a 300-horsepower high-voltage motor, cleans the gas with water and then forces it into the pipeline for purified gas. The gas is actually completely free of impurities. The small gasometer has been completed in the meantime, but has not yet been connected.

8. The gas consumption of a Cowper stove amount to 10,000 cubic meters per hour; each /blast/ furnace produces 50,000 cubic meters per hour.

9. On 5 January 1952, furnace No I had to be put out of operation again, because the pumps were being overhauled and could operate at only half their capacity. Spare pumps were put into operation, and by the morning of 6 January 1952, it was possible to resume furnace operations.

10. On 28 January 1952, furnace No II is supposed to yield its first output of iron; however, it is questionable whether this schedule can be met, since it is not yet certain whether the Cowper stoves will be ready in time. After the Cowper stoves have been lined with bricks, they must still be dried and heated, which requires another 14 days. They are then heated to a temperature of up to 100 degrees for 3 days, after which their temperature is increased by 50-70 degrees daily. When furnace No II is in operation, furnace No I is to be put out of operation for 10-14 days.

11. At present, the temperature of the crude gas, 800 degrees, is too high, since the gas washer becomes too hot. The maximum temperature should be about 600 degrees.

The thermal coefficient of the gas is 1,000-1,200 degrees, which is somewhat less than for illuminating gas. The plant is to be made profitable in the future through the production of this gas. A power plant is to be constructed later as an addition to the plant.

12. Not only is iron ore smelted at the "Vesta" Plant, but, as is generally customary in connection with smelting operations, the furnaces of the plant are also charged with a certain percentage of scrap.

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